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This chapter frames the use of social network analysis in understanding knowledge diffusion and discusses current uses of this methodology within a government agency.

The Value of Social Network Analysis in Health Care Delivery

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In their introduction to this volume, Durland and Fredericks make brief but important mention of complexity. Increased interest in social network analysis (SNA), they say, is due in part to a focus on understanding complex processes. Further discussion of complex responsive or adaptive processes may be helpful as context in understanding the impetus for and utility of SNA, particularly for those interested in using network analysis to evaluate how and why change or innovation happens, or more specifically, for understanding how knowledge or meaning is created and flows. Although there are several (competing) models (Greenhalgh and others, 2004) that attempt to explain innovation (or innovativeness) and spread (or diffusion and dissemination), SNA can always play a role in evaluating program dynamics since networks or relationships are ubiquitous, inherent in any activity.

The traditional paradigm used for understanding information or knowledge exchange is essentially a staged, mechanistic, linear one. How we connect what we know with what we do is defined as a relatively simple staged or sequential communication process whereby information or knowledge is an "it" or a "thing" that can be transferred from one individual to another or one individual receives it from another. From an organizational viewpoint, the issue becomes one of managing information or knowledge assets (explaining the enthusiasm for knowledge management). For example, improving health care delivery (the world in which I work) is largely understood as an effort to provide more research information or communication

infrastructure that facilitates the more rapid transfer or adoption of research findings or clinical evidence (Rogers, 2003).

Complexity suggests, however, that information exchange—or, more accurately, knowledge creation—is a social activity involving much more than merely taking a statement made in one context and mechanistically transferring or reproducing it in another or, as it is sometimes phrased, "dumping it down." Knowledge or knowledge creation, Stacey (2000) has argued, is not simply a sender-receiver communication exercise, where person A transfers to person B. Knowledge arises instead in complex responsive or adaptive processes between human beings. That is, knowledge creation or meaning arises as a "gesture-response." Knowledge is not a thing or a system, but an active process of relating, the property of ongoing relational interaction.

Knowledge in this sense cannot be transferred since it arises (or is continuously reproduced and potentially transformed) out of mutual adaptation between person A and person B. Knowledge or meaning becomes apparent only in the "response" to a "gesture" and therefore lies in the whole or completed social act of gesture-response. Knowledge assets therefore lie in the pattern of relationships between relating beings and are destroyed when those relational patterns are destroyed. In this sense, knowledge or information does not transfer—or transfer is only the partial or incomplete expression of the gesture-response dynamic. In sum, Stacey (2003) argues that complexity suggests an alternative paradigm that is action based, one that emphasizes the social or collaborative nature of the action of talking in which people make sense of their actions together or where knowledge creation is a process of developing shared learning or shared meaning. (What this suggests about human agency is profound: as Stacey has written, the processes of mind are the same processes as social relating or, as sometimes explained, I cannot be me without you.)

With a focus on health care improvement, Wood and Ferlie (2003) have argued that since meaning is not an inherent property of information, health care research should be conducted as a "continuous process of communication" (p. 63), or as argued by Wood, Ferlie, and Fitzgerald (1998), the production of health care knowledge or improvement should be focused on associations across different interest groups and professional fields. The production of research evidence or knowledge does not arise from an independent source. It is not given, preformed or preexistent; neither is its production stable or exogenous. Wood states that knowledge does not proceed discretely from one point to another. Research does not become clinical practice. Instead, there is a becoming from research to practice. Knowledge always inextricably combines with action, interactions, and relationships of practice. Maguire (2002) has argued that the production of research evidence and its translation or adoption (more accurately adaptation) can be simultaneous and entangled. In a study of the process by which treatment

innovations for HIV/AIDS became used, Maguire found adoption ultimately depended on several social and communication process variables including usefulness. As the novelist and medical-school-trained Walker Percy (1975, p. 131) wrote, "To a man dying of thirst the news [or knowledge] of diamonds over the next dune is of no significance. But the news of water is."

With knowledge or meaning the product of complex responsive or adaptive processes, the importance or utility of SNA should become readily apparent: network analysis becomes a useful way of making relationships visible, and, once visible or identified, network analysis can be used to develop and support network relationships as well as intentionally create them, all for the purposes of generating shared learning or shared meaning.

The use of SNA tools may be needed in health care delivery due in large part to the long-standing difficulty in increasing the pace at which improvements in clinical practice delivery are made. Numerous Institute of Medicine and other reports demonstrate unacceptable numbers of medical errors, the low percentage of Americans receiving recommended care, and the (literally) generational pace at which research evidence, using Wood's phrase, "becomes practice." In response, the World Health Organization (2005) has recently begun to address this issue, which it defines on its Web site's overview of strategies as the "know-do gap." The National Institutes of Health (NIH) is now attempting to address this issue using its "Roadmap" strategy (http://nihroadmap.nih.gov), which outlines NIH's goal of accelerating or transforming scientific knowledge or research into tangible benefits. Various foundations as well as for-profit organizations are doing similar work. *Health Affairs,* a leading health care policy journal, has recently devoted an entire issue to the topic of producing more health care research or evidence-based medicine and using it faster ("The New Imperative," 2005). (Unfortunately many of these efforts in my opinion assume the "sender-receiver" paradigm.)

My agency, the Agency for Health Care Research and Quality (AHRQ), has several initiatives under way as well to address this issue. AHRQ, an agency of the U.S. Public Health Service within the U.S. Department of Health and Human Services (DHHS), whose mission is to advance health excellence in health care, is evolving from a more strictly limited publishing model of scientific research to include a network model of collaboration. The agency is beginning to improve its own network health or ways in which it can bring people into relation with one another. For example, to improve the quality of care delivered in the United States, the agency this past year announced a new initiative, Quality Connect. Part of this effort will be to create and evaluate, using SNA, a network of hospital chief quality officers. In addition, it has recently networked with nine HMOs and with a few select states to improve diabetes care delivery and associated patient outcomes. AHRQ is as well intentionally working to develop networks and links with partners to address patient safety, disparities in care delivery, and pharmaceutical

outcomes. It is networking with other DHHS agencies, for example, the Centers for Medicare and Medicaid Services, and AHRQ is using SNA to create a sampling frame to collect stakeholder input to inform the agency's future research agenda. Furthermore, beyond using network methods to assess these efforts quantitatively and qualitatively, AHRQ is attempting to understand the qualities and capacities of these network interactions—for example, to determine the levels of awareness, concordance, inclusion, intention, respect, trust, and other qualities we are attempting to engender. From a more traditional evaluative perspective, the agency is using network analysis methods to assess the past performance of a number of AHRQ programs. All of these efforts are using or assuming a gesture-response paradigm.

As complexity suggests, programs, innovation, or learning do not proceed in clockwork fashion. Neither should approaches to program evaluation. Complexity suggests that understanding and evaluating programs or systems are contained in the patterns of relationships and interactions among agents in a network.

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